

NOTES ON THE LIFE HISTORY OF ANTHONOMUS
SYCOPHANTA WALSH (COLEOPTERA:
CURCULIONIDAE),¹ WITH DESCRIPTIONS
OF THE IMMATURE STAGES

By D. M. ANDERSON^{2,3}

When B. D. Walsh described *Anthonomus sycophanta* in 1866, he included a number of observations he had made on the life history of the species, but he said very little about the immature stages. The purpose of this paper is to supplement the life-history notes given by Walsh with information gathered in the field by the author in New York State during the summers of 1956, '57, and '58, and to describe the immature stages, other than the egg, from material collected at that time. Some information taken from specimens of this species in the collection of the U. S. National Museum is also included here.

DISTRIBUTION

The range of this species evidently extends over the major portion of the eastern and midwestern United States and eastern Canada, and into parts of the western portions of both countries, as there are specimens, all apparently representatives of *A. sycophanta*, in the collection of the U. S. National Museum from the following States and Provinces: Alberta, British Columbia, California, District of Columbia, Iowa, Kansas, Louisiana, Maine, Manitoba, Maryland, Massachusetts, Michigan, Missouri, Montana, Nebraska, New Jersey, New York, Ontario, Oregon, Pennsylvania, Quebec, Saskatchewan, Utah, Vermont, Virginia, Washington, and Wisconsin.

LIFE HISTORY

As established by Walsh (1866), this species breeds in willow leaf and twig galls made by various tenthredinid sawflies, principally of the genera *Pontania* and *Euura*. During late June and early July of 1956 and 1957, larvae, pupae, and adults of *A. sycophanta* were taken by the author from sawfly galls on *Salix fragilis* L. on the Cornell University campus at Ithaca, N. Y. Most of the galls agreed with the description given by Felt (1940) for the gall of *Pontania hyalina* Nort. (now *Pontania proxima* (Lep.)), according to Benson, 1960). See Figure 9 for a photograph of one of these galls. In early July of 1957, larvae, pupae, and adults of this species were also taken from larger, more rounded willow-leaf galls, which agreed with Felt's description of the gall of *Pontania pomum* Walsh (now *Pontania*

¹ The author is following Blatchley and Leng (1916), who decided to use the name *Anthonomus sycophanta* Walsh for this species until the type of *Anthonomus haematopus* Boheman, of which *A. sycophanta* may be a synonym, can be examined.

² The author wishes to express his appreciation to Dr. J. G. Franclemont, Department of Entomology, Cornell University, for pointing out the presence of this species on willow leaves at Ithaca, N. Y., and for taking the photograph shown in fig. 9.

³ Entomology Research Division, Agric. Res. Serv., U. S. Department of Agriculture, Washington, D. C.

hospes Walsh, according to Benson, 1960), near Hinsdale, N. Y. As described by Walsh (1866), the galls infested by the weevil had been hollowed out, were at least partly lined with frass, and, when more than one weevil was present, they were divided into cells (one cell for each individual) by partitions of frass. When an adult weevil was found in a gall, there was almost always a rounded emergence hole visible in the side of the gall. Whether such holes are made by the larvae before they pupate or by emerging adults could not be established from the material collected. The galls examined at Ithaca (a total of 188 galls) each contained a maximum of 3, usually only 1 or 2, weevil larvae, pupae, and/or adults. In the larger galls on the willows near Hinsdale, there was a maximum of 5 individuals per gall, and there were often 3 or 4 per gall in 39 galls infested (out of 142 examined). No eggs were found in the galls at either of the two localities, but punctures which had the appearance of oviposition holes were seen on the surface of many of the galls examined. On June 24, 1958, several *A. sycophanta* females were seen chewing holes in the willow-leaf galls near Hinsdale, but actual oviposition was not observed.

Many of the galls examined contained sawfly larvae, but, in agreement with Walsh's observations (1866), no weevil larvae were found in the same galls with sawfly larvae. The latter observation suggests that the weevil larvae kill the young sawfly larvae or else may themselves be killed by the latter.

In addition to immature and adult weevils and sawfly larvae, a few small lepidopterous larvae belonging to the families Blastobasidae and Olethreutidae⁴ were observed in the galls. These larvae were usually found in the company of dead weevil larvae or pupae, or dead sawfly larvae, and the galls were usually lined with silk webbing, apparently spun by the caterpillars. Whether these caterpillars were acting entirely as scavengers is not clear. In one instance, a caterpillar was found in the same gall with a living weevil larva. Another lepidopterous larva was found in the same gall with two dead weevil pupae, one of which had evidently been partially eaten. In still another gall, containing a dead sawfly larva, a small caterpillar was found just beginning to spin its silk web.

No adult parasitic Hymenoptera or Diptera were found in the galls examined, and no attempt was made to rear them from unopened galls. However, a few small, legless, hymenopterous larvae, unidentified but assumed to be parasitic, were removed from some of the galls.

By early July, 1957, many of the weevil-infested galls examined at both localities contained pupae or adults, and by the last week of July, 1956 and 1957, most of the galls found on *Salix fragilis* at Ithaca were empty, except for a few adults taken from the galls on July 31, 1956.

The host records which follow were taken from adult specimens of *A. sycophanta* in the collection of the U. S. National Museum. The year of collection and name of collector were given with most of these specimens, but are not included here. "Reared from galls (? of *Pontania*) on willow,"

⁴ Identified to family by D. M. Weisman, Entomology Research Division, ARS, U. S. Department of Agriculture.

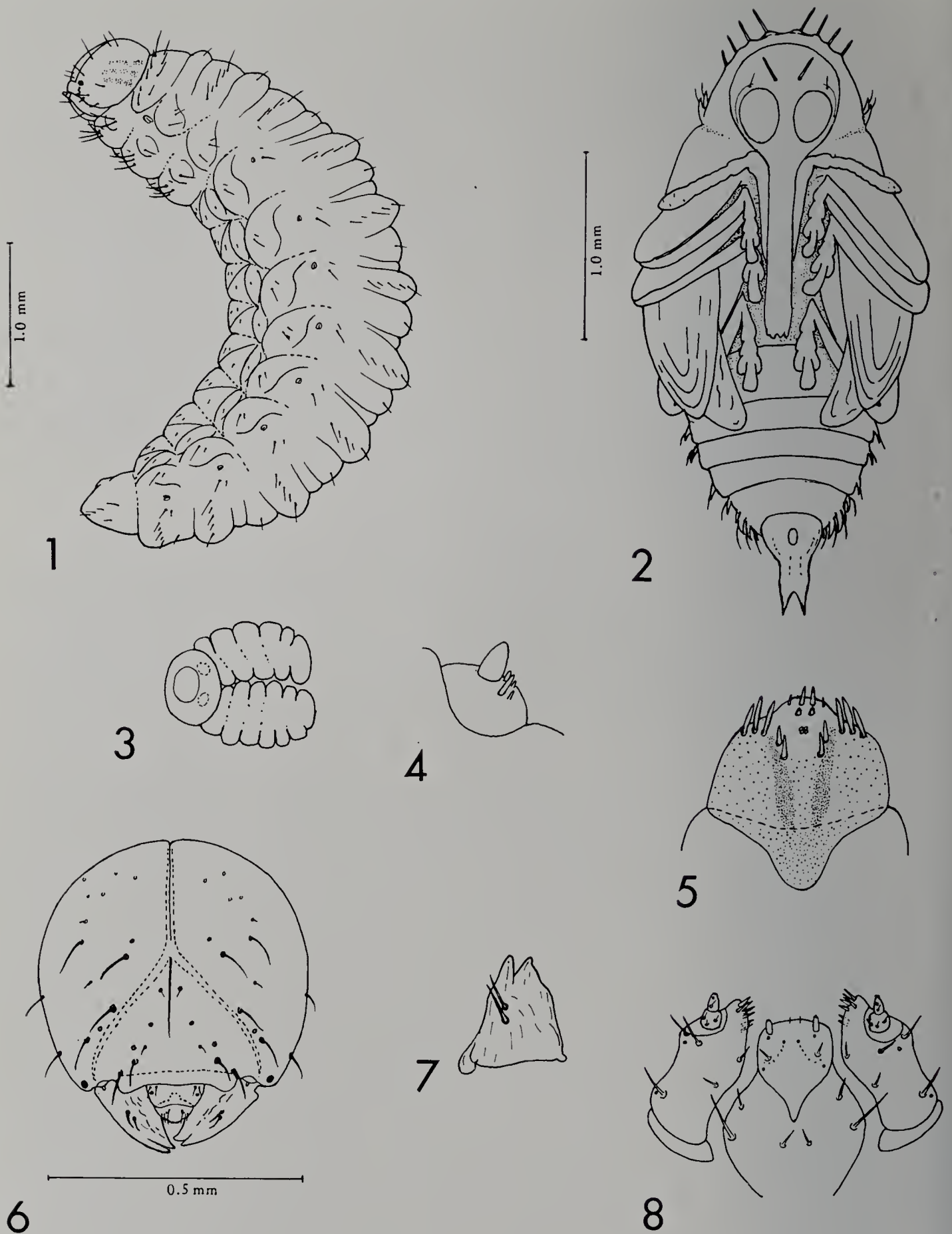
Bar Harbor, Maine, July 20; "*Pontania* gall on willow," Arlington, Mass., June; [reared] "ex willow" [dried sawfly galls attached to pins], Boston, Mass., July 7; "In galls of *Pontania pomum*," North East, Pennsylvania, Aug. 17; "on *Salix*," Wakefield, Quebec, June 20; "In willow leaf gall," Salem, Oregon, July 21; "on willow," Ashland, Oregon, April 26, and Orenco, Oregon, May 16; "Reared *Salix* sp." [from sawfly galls, according to Hopkins card 10110b], Medical Springs, Oregon [Sept. 18]; "On willow foliage," Silver Lake, Washington, June 28; "Reared ex gall on willow" [apparently a twig gall, attached to pin], Russian River, California, "about 1912" (no other data).

It should be noted here that *Anthonomus rufipennis* LeConte, a species similar in appearance to *A. sycophanta*, was reported to have been taken from the leaves of sandbar willow, *Salix interior* Rowlee, in Illinois by Tuttle (1956). It is possible that, if the life histories of the two species are similar, they may be confused in the field unless adult specimens are collected and carefully identified.

IMMATURE STAGES

The following descriptions of the larva and pupa of this species are based on numerous larvae and pupae removed from the sawfly galls collected at Ithaca, N. Y., and near Hinsdale, N. Y., during June and July of 1957. This material will be deposited in the collection of the U. S. National Museum. The terms used in the description of the larva are defined in a paper by W. H. Anderson (1947).

LARVA: Body nearly circular in cross-section, distinctly curved (Fig. 1). Head free, light yellow in color, except medium brown margins of mandibles and anterior margin of frons; a few mottled bars often visible at side of epicranium. Anterior ocelli present, black. Frontal sutures incomplete; epicranial suture approximately half as long as head capsule; endocarina very distinct, more than half as long as frons (Fig. 6). Dorsal epicranial setae 1, 2, 4, and 5 moderately long, much longer than 3; frontal seta 2 absent, setae 4 and 5 much longer than other two pairs; lateral epicranial seta 2 slightly longer than 1 (Fig. 6). Antenna bearing a subconical accessory appendage and four minute setae, one stouter and longer than others (Fig. 4). Clypeal setae subequal in length, clypeal sensilla present. Labrum bearing three pairs of setae, the posteriormost pair much longer than others, and one pair of sensilla. Epipharynx bearing three anterolateral setae on each side, six anteromedian setae, and two pairs of median spines; labral rods elongate, converging (but not fused) posteriorly; one median cluster of four sensory pores present slightly anterior to anteriormost pair of median spines (Fig. 5). Mandibles stout, bifid at tips; mandibular seta 1 about equal to and almost directly behind seta 2 (Fig. 7). Mala of maxilla bearing six dorsal and five ventral setae; maxillary palpus of two articles (Fig. 8). Postmental seta 2 long, much longer than postmental setae 1 and 3 (Fig. 8). Prementum of labium with one pair of short setae; premental sclerite showing a distinct posteromedian projection, but its anteromedian projection poorly defined (Fig. 8). Labial palpus consisting of only one article. Thoracic spiracle bicameral, its air-tubes annulate. Pronotum bearing eight long and two short setae on each side of midline. Prodorsal fold of mesothorax and metathorax each bearing one short seta on each side of midline; postdorsal folds each bearing a row of five setae, the first third, and fifth much longer than second and fourth, on each side of midline. Two long pleural setae present on prothorax; mesothorax and metathorax each bearing one long pleural seta. Alar area on meso- and metathorax apparently fused with postdorsum. Pedal area prominent, bearing three long setae and one short seta on each of three thoracic segments. Abdomen bearing eight pairs of bicameral spiracles (Fig. 3). Abdominal segments I to VII each having three dorsal folds; one short seta



FIGURES 1-8, *Anthonomus sycophanta*: 1—larva, lateral view; 2—pupa, ventral view; 3—an abdominal spiracle of larva; 4—antenna of larva, dorsal view; 5—epipharynx of larva; 6—head of larva, dorsal view; 7—left mandible of larva, lateral view; 8—labium and maxillae of larva, ventral view.



FIGURE 9, A sawfly gall on upper surface of a leaf of *Salix fragilis* L. taken at Ithaca, N. Y., opened to expose a larva and pupa of *Anthonomus sycophanta* inside. Note the partition of frass between the larva and the pupa.

present on each side of midline on each prodorsal fold; a row of five setae present on each side of midline on each postdorsal fold, the first, third, and fifth setae much longer than second and fourth (Fig. 1). Postdorsal folds of abdominal segments I to VII more prominent than prodorsal folds (Fig. 1). Epipleural folds prominent on abdominal segments I to VIII, each fold bearing one long and one short seta. One pair of spiracular setae, one very minute pleural seta, one small pedal seta, and two small eusternal setae present on each of abdominal segments I to VIII (Fig. 1). Abdominal segment IX subconical, bearing several fine setae on each side (Fig. 1). Anus ventral, subterminal, surrounded by four lobes.

Maximum width of head (based on 46 specimens measured): 0.59 mm.

PUPA (Fig. 2): Color cream white, except for eyes, which are pale to dark reddish brown, and spines and setae, which are light brown. Head bearing one pair of long, almost untapered setae and a pair of smaller, more attenuate setae on front above eyes; rostrum entirely without setae. Prothorax bearing a transverse row of three erect, stout setae on each side of dorsal midline a short distance behind apical margin, one pair of erect, stout setae (each on a short tubercle) near midline shortly behind first row of setae, and a curved, transverse row of four setae, each arising from a stout, curved spine, on each side of midline near the base. Tergum of mesothorax bearing a short, oblique row of three erect, slightly tapered setae on each side of midline. Tergum of metathorax with a transverse row of three stout setae on each side of midline. First through third abdominal terga each bearing a transverse row of four tapered setae on each side of midline, the outer three setae much longer than the innermost seta. Fourth through eighth abdominal terga bearing same number of

setae as first three, but outer three setae on each side each arising from a stout, curved spine, the spine at outer margin of tergum largest, and a small setaless spine present on each side slightly anterior to and inward from the outermost seta-bearing spine. Spines on seventh and eighth abdominal terga noticeably larger than on preceding terga. Ninth abdominal segment without spines or setae, but having a large bifurcate posterior projection, which is rather heavily sclerotized and slightly pigmented at its outer tips. A pair of rounded spiracles present on each of the first six abdominal segments, but absent or vestigial on seventh and eighth segments. Abdominal pleura and sterna without spines or visible setae. Femora and tibiae of legs unarmed.

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LITERATURE NOTICE

SCARAB BEETLES OF THE GENUS ONTHOPHAGUS LATREILLE NORTH OF MEXICO (COLEOPTERA: SCARABAEIDAE), by Henry F. Howden and Oscar L. Cartwright. Proc. United States Nat. Mus. 114(3467):1-134, 11 figs., 9 pls., 1963.—Keys to species and subspecies, descriptions, distribution maps, photographs of both sexes, and habits where known are given. 37 species occur in the U.S. and Canada, 9 of which are newly described. This revision brings to 114 the number of known species in the Western Hemisphere.